WHAT IS CLAIMED IS:

1. A method for determining the square root of a long-bit number using a short-bit processor, comprising the steps of:

(A) assuming the long-bit number to be $c\times 2^{2K}+d$, where c, $d < 2^{2k}$, and its solution to be $(a\times 2^{K}+b)^2$;

(B) finding 'a' by using a bisection method to obtain the floor value of the square root of 'c';

(C) rearranging and transforming the equations in step (A) to obtain a successive substitution equation: $b_{[n]}= (c-a^2)\times 2^{2k}+(d-b_{[n-1]}^2) / 2^{2(k+1)}$; and

(D) giving an initial value to 'b' to execute the successive substitution equation recursively several times until the equation is convergent, thereby finding 'b'.

2. The method as claimed in claim 1, wherein, in step (B), the bisection method is used to find a maximum value of 'a' that satisfies the condition of $a^2 <c$.

3. The method as claimed in claim 1, wherein, in step (D), the initial value of 'b' is 0.

4. The method as claimed in claim 1, wherein, in step (D), the successive substitution equation is executed recursively for three times.

5. A method for determining the square root of a long-bit number using a short-bit processor, comprising the steps of:

(A) assuming the long-bit number to be $c\times 2^{2K}+d$, where c, $d < 2^{2k}$, and its solution to be $(a\times 2^{K}+b)^2$;

(B) determining the solution by respectively finding the value of

'a' and 'b';

(C) finding 'a' by taking the floor value of the square root of 'c';

(D) rearranging and transforming the equations in step (A) to obtain a successive substitution equation: $b_{[n]}= (c-a^2)\times 2^{2k}+(d-b_{[n-1]}^2) / 2^{2(k+1)}$; and

(E) giving an initial value to 'b' to execute the successive substitution equation recursively for several times until the equation is convergent, thereby finding 'b'.

6. The method as claimed in claim 5, wherein, in step (C), a bisection method is used to find a maximum value of 'a' that satisfies the condition of $a^2 <c$.

7. The method as claimed in claim 5, wherein, in step (E), the initial value of 'b' is 0.

8. The method as claimed in claim 5, wherein, in step (E), the successive substitution equation is executed recursively for three times.